The FY 2001 Proposal Solicitation of the Atmospheric Chemistry Project of the NOAA Climate and Global Change Program

This summary is intended to be a supplement to NOAA's announcement of its FY 2001 Climate and Global Change Grants Program, *which gives the timetable, format, and submission procedures for proposals*. As an aid to those investigators considering preparing proposals, the present background document provides additional scientific information on the specific foci in atmospheric chemistry for which proposals are solicited.

Those interested in responding with a proposal to the FY 2001 NOAA solicitation should be cautioned that the availability of new funds cannot be accurately foreseen. FY 2001 budget constraints could severely limit available funds for new starts.

A. NOAA's Emphases and Rationale

A common major implicit theme in the NOAA's FY 1991 - FY 2001 grant's emphases are tropospheric ozone and fine particles. These species bear upon important global environmental problems. They are i) radiatively important trace species, (ii) important in controlling atmospheric oxidation and (iii) secondary pollutants with serious impacts on biota and human health. It is currently believed that a significant fraction of the ozone and fine particles in the troposphere are produced by photochemistry from precursors that have both human-influenced and natural sources. The lifetimes of the species in the troposphere are sufficiently long that they can be transported across hemispheric scales. Thus, a predictive understanding of tropospheric ozone requires a focus on the chemical and transport processes that link regional emissions to hemispheric ozone trends and distributions.

B. International Linkages

International Global Atmospheric Chemistry (IGAC) Program

The Atmospheric Chemistry Project of NOAA's Climate and Global Change Program is continuing to direct its grants support to research that aids projects of International Global Atmospheric Chemistry (IGAC) program. IGAC is a Core Project of the International Geosphere-Biosphere Program (IGBP). The IGAC program is focused on understanding the chemistry of the global atmosphere as it relates, in part, to the assimilative (i.e., oxidizing) capacity of the atmosphere and the impact of atmospheric composition on climate and climate on atmospheric composition. The IGAC program has several projects that address key aspects of the chemistry of the globe, as well as crosscutting activities that support all projects (IGAC, 1998). The research activities of the IGAC program are in various stages of readiness: many are under way now and others are still being planned.

C. **Solicited Proposal Topics**

1. 1. Intercontinental Transport and Chemistry That Involves Ozone and Fine Particles

   Intercontinental Transport and Chemical Transformation (ITCT) is a newly initiated IGAC activity that directly addresses the tropospheric chemistry and transport of ozone, fine particles and other chemically active greenhouse-compounds. ITCT will constitute the major FY 2001 emphasis of the Atmospheric Chemistry Project of the NOAA Climate and Global Change Program. The activity summarized below is deemed by the IGAC Scientific Steering Committee to be a well-planned and active area of research for which augmentations could produce needed, immediate, and high-quality results.

   Proposals are invited that address stated aspects ITCT. The goal of the ITCT activity is to provide a better understanding of the intercontinental transport and chemical transformation of anthropogenic pollution in the Northern Hemisphere and to assess the consequences of this pollution. The Northern Hemisphere continents are major global sources for most environmentally important gases and aerosols. Nearly 90% of industrial production and anthropogenic emissions occur between 20-60ºN. This research recognizes that the concentrations of trace gases and aerosols will continue to rise and impact regional/global climate. Moreover, changes in anthropogenic and biogenic emissions and variations in climate will affect atmospheric oxidant and aerosol concentrations on a hemispheric scale.

   Initially, ITCT will focus on the investigation of the chemical transformations involving ozone, fine particles, other chemically produced greenhouse compounds and persistent organic pollutants. The research needed to meet this objective involves determination of the transport and chemical transformation process that control the redistribution of ozone, fine particles and their precursors between the continents of the Northern Hemisphere. Through this research, ITCT aims to estimate the impact of human-influenced emissions from North America, Europe and Asia on the production of these compounds and the related parameters on a hemispheric scale. Specifically, the initial focus of the study is to document incidences of long-range transport of pollution into North America and Europe. The current emphases of the FY 2001 grants of the Atmospheric Chemistry Project are:

   - Analyses to help interpret ITCT-related field observations. The emphasis is on analyses that can be used to determine the influence of long-range transport of continental pollution on the concentration of ozone and fine particles along with their precursors over the North Pacific and North Atlantic regions.

Studies of evolution of ship plumes in the marine boundary layer, with particular emphasis of the importance of ship emissions to the ozone and aerosol budget of the marine troposphere, is of particular interest.

- Development, construction, integration, and/or implementation of new ground stations capable of monitoring the inflow of pollution into North American or the outflow of pollution from North America.

- Development of spatially resolved profiling (lidar) techniques to measure aerosols, or other compounds that can be operated at remote surface sites. These measurements will be used to better define the sources and processes that shape the ozone and fine particle transport into or from North America.

- Development, construction, integration, and implementation of new airborne instrumentation and sampling methods for the NOAA G-IV aircraft in support of future studies. Particular attention will be paid to the development of techniques to measure the radiatively important trace compounds that can be carried aboard this or similar aircraft flying in the troposphere during future ITCT field studies. The study should involve the design, construction, calibration and field testing of instruments and sampling inlets aboard the Grumman G-IV. Development and deployment of instrumentation for the size resolved chemical analysis of aerosols from an aircraft platform is of particular interest.

D. **References**

IGA, International Global Atmospheric Chemistry Newsletter, Issue No. 12, March 1998. IGAC Core Project Office, MIT, Bldg. 24-409, Cambridge, MA 02139-4307, USA. Tel. (617) 253-9887, Fax: (617) 253-9886, E-mail: erobbins@mit.edu